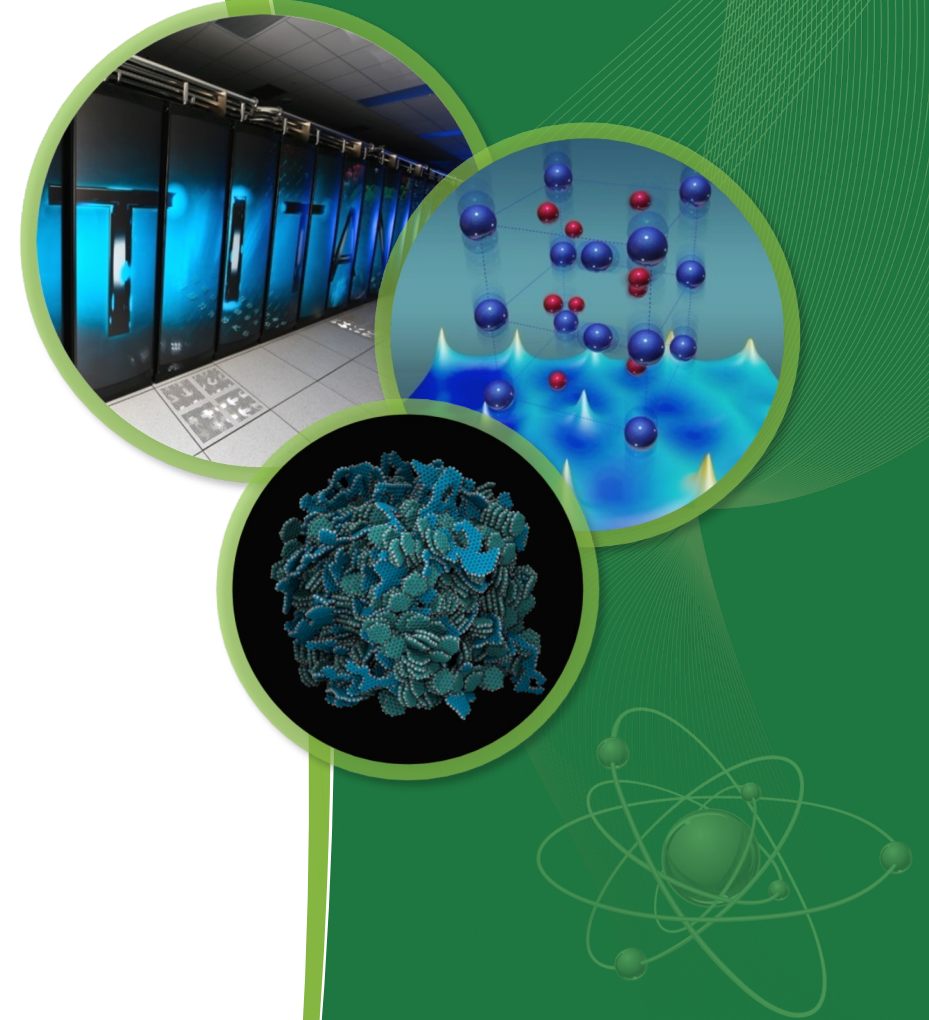


Jupyter at OLCF

Ryan Prout

HPC Engineer - User Assistance



Agenda For Today

- What is Slate?
- General, high-level, overview of Jupyter
- General, high-level, overview of Jupyter @ OLCF
- Software environments
- How to get started using Jupyter @ OLCF
- Questions/Discussion

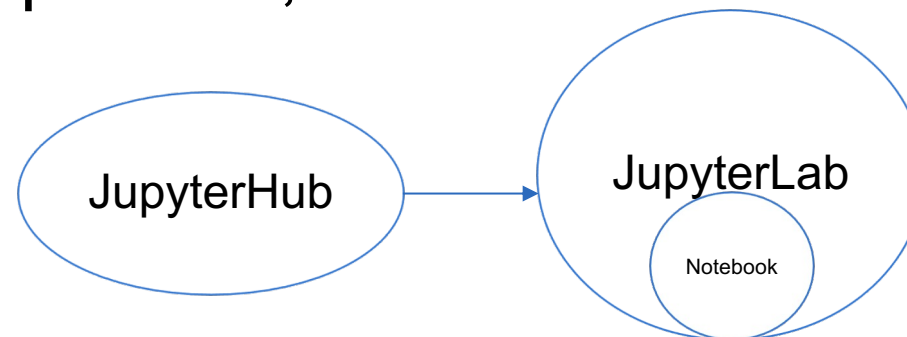
What is Slate?

- Built on Kubernetes and OpenShift
- Provides a container orchestration service for running user-managed, persistent, application services
- Supports all containerized services with Kubernetes
- Consists of two user facing OpenShift clusters in different security enclaves
- *OLCF staff provides JupyterHub as a service on Slate*

https://docs.olcf.ornl.gov/services_and_applications/slate/index.html

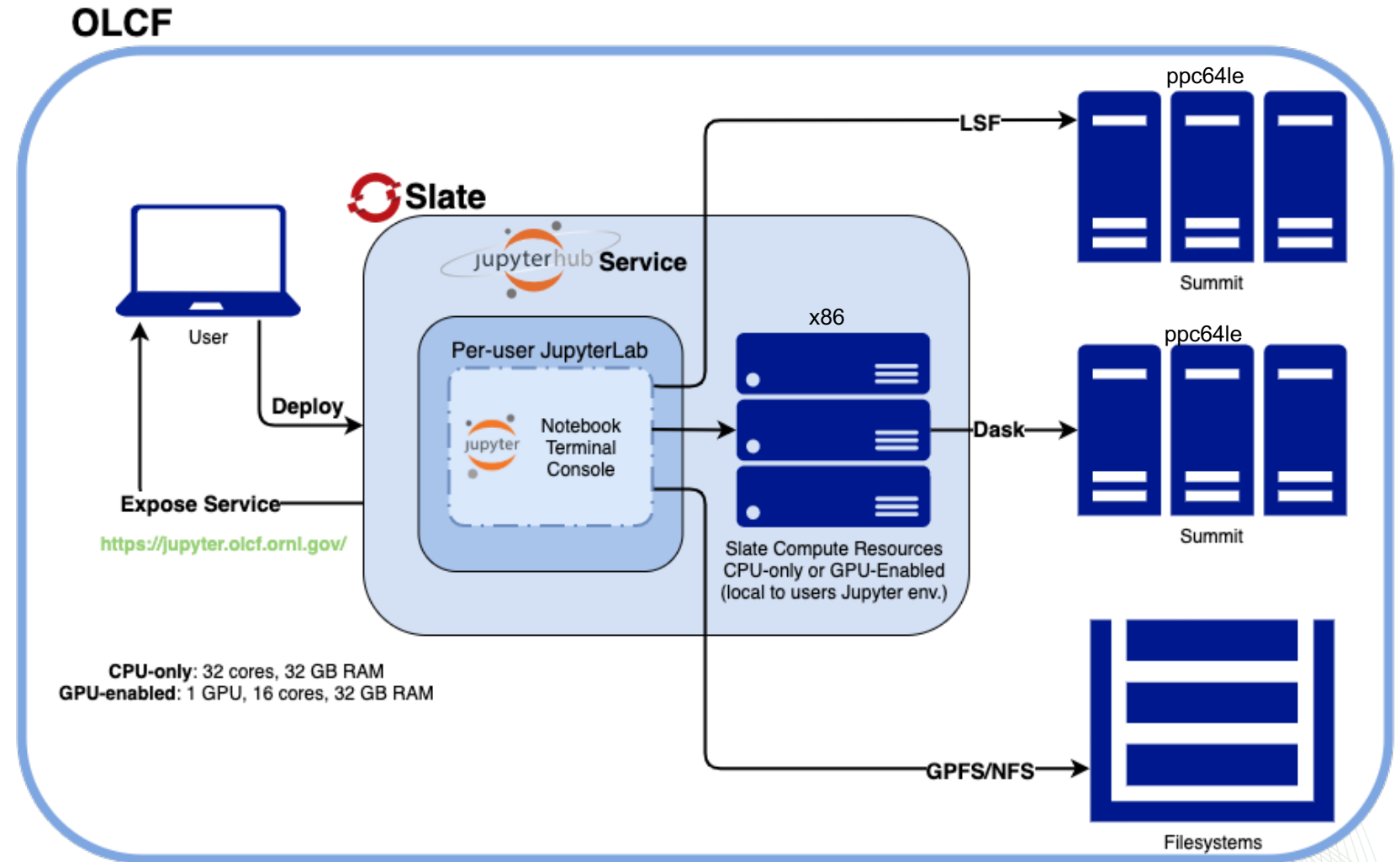
General, high-level, overview of Jupyter

- **JupyterHub** - Brings the power of notebooks to groups of users. Enables computational environments and resources without the burden of installation of and maintenance (for users).
- **JupyterLab** – Next-generation web-based user interface for Jupyter. This is launched by JupyterHub – each user gets a JupyterLab environment.
- **Jupyter Notebooks** - Document within the JupyterLab interface that allows live code, equations, visualizations and narrative text.



General, high-level, overview of Jupyter @ OLCF

- Service is exposed over the web
- Each user gets a JupyterLab environment, running with their OLCF UID
- Jupyter's local resources are from Slate's underlying hardware (Not Summit)
- CPU-only or GPU-enabled JupyterLab
- Job submission from users Jupyter environment to Summit and Andes (*bsub*, *bjobs*, *sbatch*, *squeue*)
- Jupyter's local resources are still from Slate's underlying hardware (but job submission is enabled)
- *Possible* to drive Dask workers, on Summit, from Dask client on Slate's Jupyter



JupyterLab Software Environments

- Provided “base” conda environments in JupyterLab

- Pytorch
- TensorFlow
- NumPy
- Pandas
- JAX

.....

- GPU lab has CUDA11, CuPy, and CuDNN

(take a look for full package list with “conda list”)

- Create your own conda environments on NFS/GPFS, from JupyterLab.

- “conda env list” will show you *all* your environments (whether built on Summit, Andes, or JupyterLab)
 - “/opt/conda” path denotes the environments local to your Slate-based JupyterLab
 - “/ccs/*” and “/gpfs/*” are environments built by user (either from Summit, Andes, or JupyterLab)
- **NOTE:** *JupyterLab runs on x86 hardware (underlying Slate hardware). Environments are not directly compatible between Slate, Summit, and Andes.*

```
[2]: !conda env list

# conda environments:
#
blazing-sql                /autofs/nccs-svm1_proj/stf007/rprout/dask_test
clone-py3.7.1              /autofs/nccs-svm1_proj/stf007/rprout/openslide-test
dask_dev                   /ccs/home/rprout/.conda/envs/blazing-sql
jupyter_dask_test          /ccs/home/rprout/.conda/envs/clone-py3.7.1
jupyter_lab                /ccs/home/rprout/.conda/envs/dask_dev
                           /ccs/home/rprout/.conda/envs/jupyter_dask_test
                           /ccs/home/rprout/.conda/envs/jupyter_lab
                           /ccs/proj/stf007/13322/rapids
                           /ccs/proj/stf007/rprout/base-env-clone
                           /ccs/proj/stf007/rprout/dask_test
                           /ccs/proj/stf007/rprout/phonopy-andes
                           /ccs/proj/stf007/rprout/slate-env-clone
                           /ccs/proj/stf007/rprout/slate-test-env
                           /ccs/proj/stf007/rprout/xarray-test
                           /gpfs/alpine/stf007/scratch/rprout/open-ce-clone
                           /gpfs/alpine/stf007/scratch/rprout/py3.7_base_clone
base                        *
cuda11dev                  /opt/conda
                           /opt/conda/envs/cuda11dev
```

How to get started with Jupyter @ OLCF

- Login (requires active access to an NCCS project):

<https://jupyter.olcf.ornl.gov/>

Sign in

NCCS Username:

PIN + RSA Token:

Sign In

NOTICE TO USERS

This is a Federal computer system and is the property of the United States Government. It is for authorized use only. Users (authorized or unauthorized) have no explicit or implicit expectation of privacy.

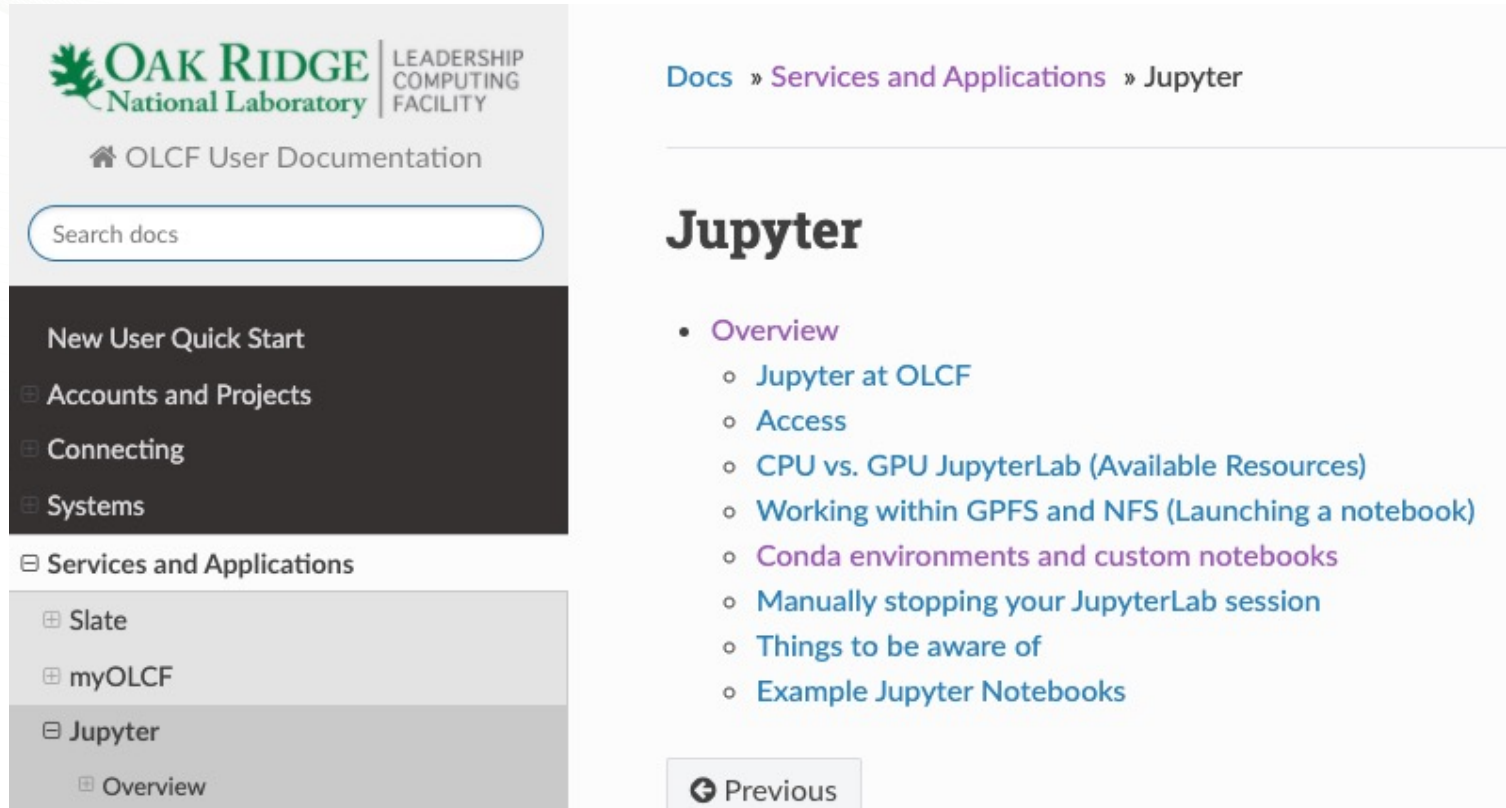
Any or all uses of this system and all files on this system may be intercepted, monitored, recorded, copied, audited, inspected, and disclosed to authorized site, Department of Energy, and law enforcement personnel, as well as authorized officials of other agencies, both domestic and foreign. By using this system, the user consents to such interception, monitoring, recording, copying, auditing, inspection, and disclosure at the discretion of authorized site or Department of Energy personnel.

Unauthorized or improper use of this system may result in administrative disciplinary action and civil and criminal penalties. By continuing to use this system you indicate your awareness of and consent to these terms and conditions of use. LOG OFF IMMEDIATELY if you do not agree to the conditions stated in this warning.

[Learn about Jupyter at OLCF.](#)

- Explore the docs:

https://docs.olcf.ornl.gov/services_and_applications/jupyter/index.html



The screenshot displays the OLCF User Documentation website. The header features the Oak Ridge National Laboratory logo and the text 'LEADERSHIP COMPUTING FACILITY'. Below the header is a search bar labeled 'Search docs'. The left sidebar contains a navigation menu with the following items: 'New User Quick Start', 'Accounts and Projects', 'Connecting', 'Systems', 'Services and Applications' (expanded), 'Slate', 'myOLCF', 'Jupyter' (expanded), and 'Overview'. The main content area shows the breadcrumb 'Docs » Services and Applications » Jupyter' and the title 'Jupyter'. A list of links is provided under the heading 'Overview': 'Jupyter at OLCF', 'Access', 'CPU vs. GPU JupyterLab (Available Resources)', 'Working within GPFS and NFS (Launching a notebook)', 'Conda environments and custom notebooks', 'Manually stopping your JupyterLab session', 'Things to be aware of', and 'Example Jupyter Notebooks'. A 'Previous' button is located at the bottom left of the main content area.

OAK RIDGE National Laboratory | LEADERSHIP COMPUTING FACILITY

OLCF User Documentation

Search docs

New User Quick Start

- Accounts and Projects
- Connecting
- Systems
- Services and Applications
 - Slate
 - myOLCF
 - Jupyter
 - Overview

Docs » Services and Applications » Jupyter

Jupyter

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